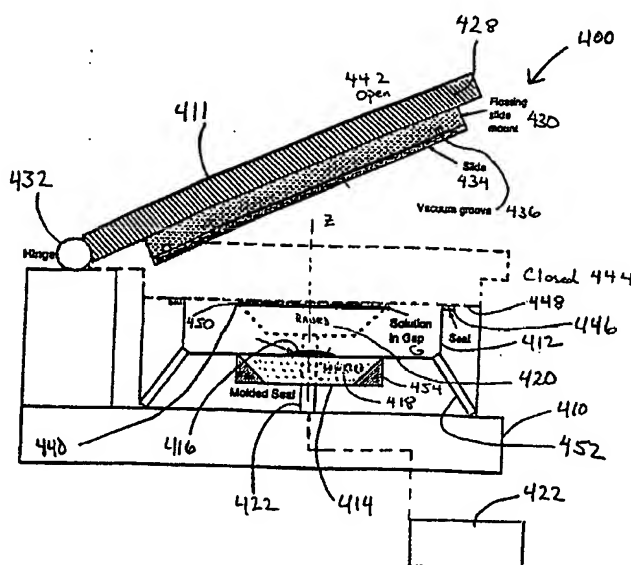




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| (74) Agents: ABNEY, James, R. et al.; Kolisch, Hartwell, Dickinson, McCormack & Heuser, Suite 200, 520 S.W. Yamhill Street, Portland, OR 97204 (US). | | | |

(54) Title: DEVICES AND METHODS FOR SAMPLE ANALYSIS



(57) Abstract

Devices (400) and methods for containing and analyzing small volumes (416) that are sandwiched between solid surfaces. The devices (400) may include an automated drive mechanism (424) that controls the relative positions of the surfaces and an environmental-control mechanism (411) that controls the humidity, temperature, and/or other environmental conditions around the small sample volume. In some embodiments, at least one of the surfaces has a light-transmissive window for allowing optical analysis of a sample contained between the surfaces.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/16453

| A. CLASSIFICATION OF SUBJECT MATTER IPC(6) : G01N 21/00, 1/10; B01L 3/00 US CL : 356/36, 244, 246, 440, 436; 422/102, 104; 250/576 According to International Patent Classification (IPC) or to both national classification and IPC | | | | | | | | | | | | | | |
|--|--|---|--|---|--|--|--|--|---|---|--|--|--|--|
| B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 356/36, 244, 246, 440, 436; 422/102, 104; 250/576 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched none Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) none | | | | | | | | | | | | | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | | | | | | | | | | | | | |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | | | | | | | | | | | | |
| X --- Y | US 4,801,804 A (ROSENTHAL) 31 January 1989 (31/01/89), column 3 lines 12-68, column 4 lines 1-47. | 1-5, 7-8, 14-15, 17-18, 20-22, 24-26, 31 ----- 6, 9, 10-13, 16, 19, 23-27 | | | | | | | | | | | | |
| X --- Y | US 5,772,967 A (WANNLUND et al.) 30 June 1998 (30/06/98), figures 1-7, column 8 lines 30-33, column 10 lines 12-39, column 16 lines 58-63. | 35, 36, 38-43, 51 ----- 37, 44-50, 52-53 | | | | | | | | | | | | |
| Y | US 5,353,112 A (SMITH) 04 October 1994 (04/10/94), figure 1, column 5 lines 6-8. | 13, 16 | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex. | | | | | | | | | | | | | | |
| <table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier document published on or after the international filing date</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table> | | | * Special categories of cited documents: | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention | "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone | "E" earlier document published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art | "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family | "O" document referring to an oral disclosure, use, exhibition or other means | | "P" document published prior to the international filing date but later than the priority date claimed | |
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| "P" document published prior to the international filing date but later than the priority date claimed | | | | | | | | | | | | | | |
| Date of the actual completion of the international search 17 FEBRUARY 2000 | | Date of mailing of the international search report 09 MAR 2000 | | | | | | | | | | | | |
| Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230 | | Authorized officer SANG NGUYEN Telephone No. (703) 308-6426 | | | | | | | | | | | | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/16453

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|---|---|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | US 5,349,436 A (FISCH) 20 September 1994 (20/09/94), figures 1A-3B. | 6, 12, 23, 27 |
| Y | US 2,056,791 A (LOGAN) 06 October 1936 (06/10/36), figures 1, 2, 4. | 9 |
| Y | US 5,457,527 A (MANNS et al.) 10 October 1995 (10/10/95), column 2 lines 42-45, column 3 lines 22-30. | 10, 11, 19, 37, 44-49 |
| Y | US 4,599,315 A (TERASAKI et al.) 08 July 1986 (08/07/86), figures 3 and 4, column 5 lines 42-45. | 50, 52, 53 |
| A | US 4,053,381 A (HAMBLIN et al.) 11 October 1977 (11/10/77), see entire document. | 28-30 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/16453

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
claims 35-53
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/16453

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s) 1-31, drawn to a device for containing a fluid sample to be analyzed comprising a first surface, a second surface, an automate drive mechanism.

Group II, claim(s) 32, drawn to an examination platform comprising a sample holder having one or more examination sites, a cover structure, a drive mechanism.

Group III, claim(s) 33-34, drawn to an examination chamber for labeling a substrate comprising an environmentally controlled chamber, a removable cover, a drive mechanism for moving at least a portion of the bottom surface into the cover.

Group IV, claims 35-53, drawn to a multi-sample containment system comprising a microplate having an array of wells, a cover member having a plurality of protrusions, each protrusion having a lower surface that contacts a sample opposite the bottom surface of the corresponding well.

The inventions listed as Groups I, II, III, and IV do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

(1) the four inventions are distinguished by their mutually details as set out above and they are classified in different classes, for example, Group I is classified in class 356 subclass 440, Group II is classified in class 356 subclass 36, Group III is classified in class 422 subclass 102, and Group IV is classified in class 346 subclass 246; (2) they have a separate status in the art because of their recognized divergent subject matter.